



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification: G06F 17/60	A1	(11) International Publication Number: WO 00/55780 (43) International Publication Date: 21 September 2000 (21.09.2000)
(21) International Application Number: PCT/US00/02326 (22) International Filing Date: 01 February 2000 (01.02.2000) (30) Priority Data: 09/271,356 17 March 1999 (17.03.1999) US (60) Parent Application or Grant CENDANT PUBLISHING, INC. [/]; (). KELLER, Brett [/]; (). MELLAND, Scot [/]; (). ISAAC, Martin [/]; (). LAROY, Gary [/]; (). DELUCA, Vincent, M. ; ().	Published	
(54) Title: COMPUTER-IMPLEMENTED SYSTEM AND METHOD FOR BOOKING AIRLINE TRAVEL ITINERARIES (54) Titre: SYSTEME ET PROCEDE INFORMATIQUES POUR LA RESERVATION D'ITINERAIRES DE VOYAGE DE LIGNES AERIENNES		
(57) Abstract <p>A method and apparatus for purchasing an airline ticket, includes entering into a computer information describing a flight desired by a consumer (102), including a target price (103), and performing a search on an airline reservation system database for flights corresponding to the desired flight information (102). The method determines whether a flight found during the search has a fare that is at least equal to the target price (103), and if so books the flight to hold it for the consumer for a predetermined period of time to allow the consumer to effect payment. The consumer is informed by e-mail notification of the seat reservation and instructing the consumer regarding payment requirements to effect purchase of the airline ticket. If a flight having the target price (103) or better is found, the method continues to periodically perform the search over a predetermined number of days into the future, and inform the consumer by e-mail of the ongoing results of the search (201).</p> (57) Abrégé <p>L'invention concerne un procédé et un appareil pour l'achat d'un billet d'avion. Ledit procédé consiste à entrer dans des renseignements informatiques décrivant un vol recherché par un consommateur (102), comportant un prix cible (103), et à rechercher dans une base de données de système de réservation de lignes aériennes les vols correspondant aux informations de vol recherchées (102). Ledit procédé permet de déterminer si un vol trouvé au cours de la recherche est à un tarif égal au prix cible (103), et si c'est le cas, à réserver le vol, de sorte qu'il soit retenu pour le consommateur pendant un période prédéterminée de manière à lui permettre d'effectuer le paiement. Le consommateur est informé par notification E-mail de la réservation de la place et reçoit des instructions concernant les conditions de paiement requises pour effectuer l'achat du billet d'avion. Si un vol correspondant au prix cible (103) ou à meilleur marché est trouvé, la recherche continue périodiquement pendant un nombre de jours prédéterminé dans le futur, et le consommateur est informé par E-mail des résultats en cours de la recherche (201).</p>		

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<pre>graph TD 101[101 USER LOGIN] --> 102[102 ENTER CITY PAIRS AND TRAVEL DATES] 102 --> 103[103 ENTER TARGET PRICE] 103 --> 104[104 ENTER CARRIER PREFERENCE] 104 --> 105[105 ENTER TRAVEL FLEXIBILITY] 105 --> 106[106 ENTER NAMES AND NUMBER OF PASSENGERS] 106 --> 107[107 SEARCH]</pre>			

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Description

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**COMPUTER-IMPLEMENTED SYSTEM AND METHOD FOR
BOOKING AIRLINE TRAVEL ITINERARIES**

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BACKGROUND OF THE INVENTION

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1. Field Of The Invention

5 The present invention generally relates to interactive
25 computer systems, such as interactive Web sites on the
Internet. In particular, the invention relates to a computer-
implemented system and method for enabling on-line customers to
purchase airline travel tickets at the best possible price.

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10 **2. Description Of The Background Art**

There are known in the art interactive travel services on
the Internet that allow consumers to purchase airline travel
35 tickets on-line. Typically, such services require the consumer
to input to the travel service server information regarding the
15 origination and destination cities, dates and approximate times
of departure, and optionally a preferred carrier. The travel
40 service then carries out a search on a commercial on-line
airline reservation system such as Apollo or SABRE.

20 The service then displays to the user a list of flights
45 for which seats are listed as being available at that time,
together with the fares for such flights. The user then has
the option of purchasing a selected flight from the list,
either by transmitting to the service credit card information
50 over the Internet, by calling a telephone number or possibly by
25 transmitting payment information by facsimile.

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5 A system is also known whereby a consumer can specify a
price at which she is willing to purchase an airline ticket for
travel between designated cities. In order to make use of this
service, however, the consumer must be willing to make an
10 5 irrevocable offer, with the possible result that the consumer
may have to accept tickets for a flight schedule and time of
departure that may be inconvenient or less than desirable.
Once a carrier has accepted the consumer's offer, the fare is
15 automatically charged to the consumer's credit card and the
consumer is not able to cancel or to receive a refund. As
10 such, the consumer may be stuck with tickets for a flight that
is inconvenient, with a carrier that the consumer may wish to
20 avoid, or in a worst case, for a flight at a time that the
consumer cannot travel because of unexpected intervening
15 events. Conversely, if the consumer's offer is rejected by all
airlines, the request is canceled and the consumer must go
25 through the entire data entry process again to initiate another
request.

Many Internet travel services also provide an e-mail
20 service through which subscribers are regularly notified of so-
called "lowest fares" available for flights between specified
city pairs. However, such fares typically represent the lowest
published fares as published in airline tariffs, and do not
35 represent fares actually available on particular flights. As
25 such, it is common that when the consumer accesses an Internet
travel service website in response to such an e-mail
notification, she will not be able to purchase any tickets for
40 the so-called "lowest published fare" on any actual flight.

There remains a need in the art for an interactive travel
30 service that not only allows the consumer to set her own price
for airline travel, but once such a flight is found, gives the
45 consumer the freedom to make a final decision as to whether to
actually purchase the airline tickets within a certain time
frame.

SUMMARY OF THE INVENTION

5 The present invention solves the existing need by
providing a method of purchasing an airline ticket, including
the steps of entering into a computer information describing a
flight desired by a consumer, including a target price,
10 5 performing a search on an airline reservation system database
for flights corresponding to the desired flight information,
determining whether a flight found during the search has a fare
that is at least equal to the target price, automatically
15 booking a flight found to be at least equal to the target price
to thereby reserve a seat on said flight, and informing the
10 consumer of the seat reservation and instructing the consumer
regarding payment requirements to effect purchase of the
20 airline ticket.

According to a second aspect, the invention provides
15 apparatus for purchasing an airline ticket that implements the
abovementioned method.

25 According to a third aspect of the invention, the
invention provides a method of purchasing an airline ticket,
including the steps of entering into a computer information
20 describing a flight desired by a consumer, including a target
price, performing a search on an airline reservation system
30 database for flights corresponding to the desired flight
information, determining whether a flight found during the
search has a fare that is at least equal to the target price,
35 25 when no flights having fares at least equal to the target price
have been found, periodically performing the search over a
predetermined number of days, and informing the consumer of the
40 results of each search. In a preferred embodiment, the
notification is transmitted to the consumer by e-mail.

BRIEF DESCRIPTION OF THE DRAWINGS

5 The invention will become more clearly understood from the following detailed description in connection with the accompanying drawings, in which:

10 5 FIG. 1 is a flow diagram of a user login procedure according to one embodiment of the invention;

FIG. 2 is a flow diagram of a process for presenting fare search results to the user;

15 10 FIGs. 3A-3D are flow diagrams of alternate fare search requests and search result determinations, depending upon user preferences and flexibility;

20 FIG. 4 is a flow diagram of a process for determining whether to book a return itinerary or to ask the user to request a continued search;

15 25 FIG. 5 is a block diagram of a distributed communication network system according to the invention; and

FIG. 6 is a flow diagram of a process for carrying out continuing fare searches according to one embodiment of the invention.

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30 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring to Fig. 5, a system according to one preferred embodiment of the invention includes a flight booking server 501, a client station 502, a commercial airline reservation database system 503, and a distributed communication network 504. According to one preferred embodiment, network 504 is the Internet, and server 501 contains a URL on the World Wide Web. Client station 502 may be a desktop computer, notebook computer, workstation, minicomputer, or other similar type of computer. Server 501 preferably is a multiple line Internet server of a type that is commercially available.

45 Airline reservation system 503 may be one of a number of professional information database providers, such as SABRE or Apollo. Such databases compile, among other things, airline travel information for all major carriers, including routes, timetables, fares, tariffs and associated rules and

5 restrictions. The airline reservation system 503 is accessed
by formulating searches in a predetermined format that is
compatible with the search engine commands of the system. The
format and commands of the system will be known to those
10 5 skilled in the art and thus no further explanation will be
provided here.

Referring to Fig. 1, a consumer wishing to purchase
airline travel tickets "logs in" to the server, such as by
15 inputting the URL of the booking server on the consumer's Web
browser, at step 101. At this time, the consumer or user will
be presented with a web page containing spaces for information
to be entered by the user. At step 102, the user enters as
20 basic request data the departure and destination cities, along
with the dates of departure and return. At step 103, the user
15 enters a target price, representing the fare that the user
would like to pay for the tickets. After this preliminary data
entry, at step 104 the user may enter a carrier preference, or
25 may indicate no preference among airlines by requesting the
booking server to search among all air carriers for the best
fare.

30 At step 105, the user may indicate whether her travel
plans are flexible, such that the user may depart or return
from one to three days before or after the entered travel
dates. If the user's plans are flexible, the user will
35 25 indicate whether the flexibility is respect to the date of
departure or date of return, and will indicate the number of
days either before or after the inputted date of travel. If
40 the user is not flexible, the user will enter "not flexible" in
the appropriate line on the web page.

30 At step 106, the user enters the number and names of
additional accompanying passengers, if any, and at step 107,
45 the user requests the booking server to initiate a search for a
flight meeting the entered information, which is at or below
the user's indicated target price. The booking server also
35 requests the user to input address, telephone and e-mail

address information for booking and future communication purposes.

As will be described in detail below, the booking server next generates a search entry and transmits it to the airline reservation system, and receives a return itinerary representing the results of the search. As shown in Fig. 2, in the event that the search failed to uncover a flight meeting the user's specifications that is at or below the user's target price, the lowest available fares are displayed at step 201.

The number of fares displayed can be any number, sorted from lowest to highest fare; in the preferred embodiment the two lowest fares are displayed. The user is then given the opportunity to request the booking server to try to hold a seat or seats at one of the displayed fares, at step 202. If the user decides to accept one of the fares by clicking on the appropriate link at step 203, the booking server will book the itinerary at step 204. This will in effect hold the seats for the user for a certain period of time, usually 24 hours, during which the user must actually purchase the tickets. If the user fails to purchase the tickets, the booking is canceled.

If the user does not want to book the flight at the displayed fare, the user clicks on the appropriate link at step 205. The booking server at step 206 then asks the user whether she wishes for the booking server to continue to search for fares meeting or beating the target price. If the user indicates that continued searching is desired, the itinerary and target price file is placed into a search memory at step 207. Otherwise, at step 208, the user clicks on one of a number of alternate links and is taken to the page specified by the link.

Various possible search configurations and result analyses according to the present invention will be described with reference to Figs. 3A - 3D. Step 3001 represents the situation where the user has not specified any preferred carrier, and has indicated no flexibility regarding the travel dates. At step 3002, the booking server creates an "open

5 segment," which is a shell itinerary entry that serves as a
template for the fare search engine of the reservation system.
The booking server will create an open segment for each leg of
the user's trip. At step 3002, the booking server generates a
10 5 "BFP" entry with optional generic qualifiers. BFP stands for
"Bargain Finder Plus." Bargain Finder Plus is a suite of
commands that allow the SABRE reservation system to evaluate a
specific travel request to determine the lowest price itinerary
15 10 for a given set of travel qualifications. A BFP entry is a
SABRE fare search engine entry that searches over 1000 travel
options to determine the lowest priced alternatives for
scheduled flights, based on the specific criteria contained in
20 the open segment and from additional qualifiers, if any,
contained in the entry. BFP allows a user or a robotic agent
15 to perform the search taking into account times of day, flight
availability, carrier preference, multi-airport cities and
25 connection cities.

Generic qualifiers may include entries such as negative
biases for airlines which the booking server has placed on a
20 20 "stop sell" list, either because they are in questionable
financial condition or have not conducted business in a
30 consumer-friendly manner. Qualifiers may also include positive
biases for booking server-preferred carriers. Use of booking
server-preferred carrier qualifiers enables the booking server
35 25 to look deeper into the carrier's schedules to locate the
lowest possible fares.

At step 3004, the BFP entry is transmitted to the airline
reservation system search engine. The search engine uses the
40 BFP entry to search the airline schedule database, and returns
30 the search results to the booking server.

At step 3005, the booking server will transmit a "fare
45 shop" entry to the search engine. A fare shop entry is an
airline reservation system entry that identifies the lowest
published fare for a given itinerary, regardless of
35 applicability to the specified dates of travel or actual
50 availability of fares. The fare shop entry returns a "best

5 case" price that typically would have many conditions and
restrictions attached to it. The fare shop search results also
are returned to the booking server..

10 At step 3006, the booking server determines the two
lowest fares from the returned BFP search results, by filtering
the results first by fare and then by booking server
preferred/non-preferred carrier status. The fare shop results
are then filtered by eliminating negative-bias carriers or
15 those carriers who have published fares but who do not have any
present service for the market. The lowest resulting published
fare is then retained as the fare shop search result.

20 Fig. 3B illustrates the process for the situation,
represented at step 3101, where the user has specified a
preferred carrier, and has indicated no flexibility in travel
15 dates. Open segments are created at step 3102 and BFP entries
are generated at step 3103, similar to Fig. 3A. At step 3104,
the booking server generates a BFP entry containing the open
segment and having as a qualifier the preferred carrier or
carriers specified by the user. At step 3105 the BFP entries
20 are transmitted to the fare search engine of the airline
reservation system, and at step 3106 a fare shop entry for the
open segment is transmitted to the search engine.

25 At step 3107, the booking server determines, from the
return BFP entries, the lowest airfares available among the
35 user's specified preferred carriers, and the lowest airfares
available for all carriers (filtered for negative bias and
other generic qualifiers as appropriate). At step 3108, the
lowest published fare is determined from the fare shop search
40 results, filtered for negative-bias carriers and carriers with
published fares but with no service in the market.

30 Referring to Fig. 3C, step 3201 represents the situation
where the user has not specified any preferred carrier and has
45 indicated flexibility in the entered dates of travel. At step
3202, open segments are created as above. At step 3203, BFP
35 entries are generated using the open segments and optional
qualifiers, such as negative carrier bias or booking server-

5 preferred carrier bias. At step 3204, BFP entries are
generated with the consumer's flexibility in travel dates
indicated. The BFP entries are transmitted to the airline
reservation system search engine at step 3205, and a fare shop
10 5 entry is transmitted at step 3206. In this instance, the
booking server at step 3207 determines the two lowest fares
from the return BFP entries, based first on fare, then on
preferred date of travel, and then by booking server-
15 10 preferred/non-preferred carrier. At step 3208, the lowest
published fare is determined from the return fare shop entry,
as above.

Step 3301 in Fig. 3D represents the case where the user
20 has specified a preferred carrier, and has indicated
flexibility in travel dates. Open segments are created at step
15 3302, and generic BFP entries with optional qualifiers are
generated at step 3303. At step 3304, BFP entries are
25 generated contained the user's specified carrier as a
qualifier, at step 3305, BFP entries are generated with the
user's flexibility indicated, and at step 3306 BFP entries are
20 generated with the specified carrier as a qualifier and the
30 user's flexibility indicated. The BFP entries are transmitted
to the airline reservation system search engine at step 3307,
and the fare shop entry is transmitted at step 3308.

35 The search results in the form of return BFP entries and
25 return fare shop entries are received by the booking server,
and at step 3309 the booking server determines the two lowest
fares based on the lowest airfare available on the user's
40 preferred carrier, the lowest airfare available on the user's
preferred carrier on the specified travel dates, and the lowest
30 airfare available for all carriers (subject to the negative-
bias qualifier placed in the BFP entry). At step 3310, the
45 lowest published fare is determined from the return fare shop
entry, as explained above.

Fig. 4 illustrates a process for acting on the lowest
35 fare results determined in Figs. 3A - 3D, according to a
50 preferred embodiment of the invention. At step 401, the BFP

entry return itineraries are compared with the consumer's target price. At step 402, it is determined whether the lowest airfares (as determined in Figs. 3A - 3D) are less than or equal to the consumer's inputted target price. If so, at step 403 the booking server returns the fare and itinerary to the airline reservation system for a booked itinerary, providing the consumer's identification information as required. At this point, the seats are held for the consumer for a predetermined period of time, such as 24 hours, during which the consumer must make payment. At step 404, the booking server displays the booked itinerary to the consumer at the client station, and prompts the client for payment. Payment may be effected by directing the consumer to call an 800 number, or in the alternative may present the consumer with the option of entering credit card information over the Internet (preferably through a secure site using encrypted communication).

If the search results fail to find an airfare that meets or is lower than the consumer's target price, the booking server at step 405 selects the two lowest fares and the lowest fare shop fare (i.e., published fare), and displays them along with the itinerary to the consumer. The server at step 406 then prompts the consumer (client) as to the consumer's desire to have the server keep searching for possible lower airfares for the subject itinerary.

According to the invention, the server will store the consumer's itinerary together with the consumer's personal information including the consumer's e-mail address, and will request additional searches for a predetermined number of days subsequent to the original search. It is well known in the airline industry that changes in flight fares, conditions, restrictions, etc. are made daily and literally tens of thousands (or more) of fare changes are made and published each day.

According to the procedure shown in Fig. 6, at step 601, stored user itinerary files are retrieved from a search memory storage area in the booking server. Such files are those for

5 which consumers have requested additional searching. The files
may be stored with the date of the original search, so that
upon retrieval that date is compared with the present date to
determine whether to continue the search or to discard the
10 5 file.

Assuming the search should proceed, at step 602 the BFP
and fare shop entries are transmitted to the airline
reservation system search engine as disclosed above. At step
15 603, the return results are compared with the consumer's target
10 price. If there exists an airfare less than or equal to the
consumer's target price as determined at step 604, the fare is
returned to the reservation system for a booked itinerary,
20 which thereby reserves the seat for the consumer for a
predetermined period of time. At step 605, the booking server
15 immediately sends the consumer an e-mail message notification
that an airfare meeting the consumer's target price has been
25 found, and provides the consumer with instructions for
purchasing the tickets in the event that the consumer still
wishes to do so.

20 If the search results still fail to return an airfare
30 meeting the consumer's target price, at step 607 the server
will notify the consumer by e-mail of the search results,
including the lowest available fares found during that search,
35 and at step 608 the booking server will return the consumer's
25 file to storage for performing another search the next day,
until the predetermined number of days have expired. According
to a preferred embodiment of the invention, the search is
40 carried out for seven consecutive days; however, any other
number of days may be chosen during which to carry out the
30 search. In this manner, the present invention provides a
system and method whereby a consumer can be assured that a seat
45 on an actual flight will be reserved if a fare is found that
meets the consumer's target price. This represents a
significant advance in the art over existing e-mail travel
35 notification services which simply inform the consumer of the
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lowest published fares for a given itinerary, which may bear no relationship to available fares on actual flights.

As a corollary to the invention, a service may be provided wherein the server accepts a user's travel dates, city pair, times, carrier preference, e-mail address, and preferred day of e-mail delivery, and perform scheduled searches over a predetermined period of time (for example, once a week for one month) to find the lowest available fare and lowest published fare, and deliver the search results to the user by e-mail. In this way, the user will gain a better recognition of the direction, magnitude, and frequency of fare changes over an extended period of time, and thus will be able to set a more realistic target price for a flight when the user desires to have the server actually hold a seat once the target price (or better) has been found.

The invention having been described, it will be apparent to those skilled in the art that the same may be varied in many ways without departing from the spirit and scope of the invention. Any and all such modifications are intended to be included within the scope of the following claims.

Claims

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What is claimed is:

- 5 1 1. A method of purchasing an airline ticket, comprising the
2 steps of:
3 entering into a computer information describing a flight
4 desired by a consumer, including a target price;
10 5 performing a search on an airline reservation system
6 database for flights corresponding to said desired flight
7 information;
15 8 determining whether a flight found during the search has
9 a fare that is at least equal to said target price;
10 automatically booking a flight found to be at least equal
11 to said target price to thereby reserve a seat on said flight;
20 12 and
13 informing the consumer of the seat reservation and
14 instructing the consumer regarding payment requirements to
15 effect purchase of the airline ticket.
- 25 1 2. The method of claim 1, wherein the step of entering
2 comprises the step of entering a preferred carrier, and the
3 step of searching comprises the step of qualifying the search
30 4 with the preferred carrier.
- 1 3. The method of claim 1, wherein the step of entering
35 2 comprises the step of indicating flexibility in dates of
3 travel, and the step of searching comprises the step of
4 broadening the search to encompass the indicated flexibility.
- 40 1 4. The method of claim 1, further comprising the step of
2 continuing the step of searching for a predetermined number of
3 days when a first search has failed to find a flight that is at
4 least equal to said target price, and performing the steps of
45 5 automatically booking and informing the consumer when a such a
6 flight is found during a continued search.
- 1 5. The method of claim 1, wherein the step of informing
50 2 comprises sending an e-mail notification to the consumer.

- 5
1 6. The method of claim 1, wherein said computer is a server on
2 the Internet.
- 10
1 7. Apparatus for purchasing an airline ticket, comprising:
2 a computer for receiving information describing a flight
3 desired by a consumer, including a target price; and
4 a program in said computer for performing a search on an
15 5 airline reservation system database for flights corresponding
6 to said desired flight information;
7 said program determining whether a flight found during
8 the search has a fare that is at least equal to said target
20 9 price;
10 said program automatically booking a flight found to be
11 at least equal to said target price to thereby reserve a seat
12 on said flight; and
25 13 said program informing the consumer of the seat
14 reservation and instructing the consumer regarding payment
15 requirements to effect purchase of the airline ticket.
- 30
1 8. The apparatus of claim 7, wherein the information received
2 by said computer includes a preferred carrier, and said search
3 is qualified with the preferred carrier information.
- 35
1 9. The apparatus of claim 7, wherein the information received
2 by said computer includes flexibility in dates of travel, and
3 said search encompasses the indicated flexibility.
- 40
1 10. The apparatus of claim 7, wherein said program continues
2 the search for a predetermined number of days when a first
3 search has failed to find a flight that is at least equal to
45 4 said target price, and performs the steps of automatically
5 booking and informing the consumer when a such a flight is
6 found during a continued search.

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- 5 1 11. The apparatus of claim 7, wherein said program informs
 2 said consumer by sending an e-mail notification to the
 3 consumer.
- 10 1 12. The apparatus of claim 7, wherein said computer is a
 2 server on the Internet.
- 15 1 13. A method of purchasing an airline ticket, comprising the
 2 steps of:
 3 entering into a computer information describing a flight
 4 desired by a consumer, including a target price;
 5 performing a search on an airline reservation system
20 6 database for flights corresponding to said desired flight
 7 information;
 8 determining whether a flight found during the search has
 9 a fare that is at least equal to said target price;
25 10 when no flights having fares at least equal to said
 11 target price have been found, periodically performing the
 12 search over a predetermined number of days, and informing the
 13 consumer of the results of each search;
30 14 automatically booking a flight found to be at least equal
 15 to said target price to thereby reserve a seat on said flight;
 16 booking a flight at a lowest available fare when
 17 requested by the consumer in response to a notification of the
35 18 results of a continued search; and
 19 informing the consumer of the seat reservation and
 20 instructing the consumer regarding payment requirements to
40 21 effect purchase of the airline ticket.
- 1 14. The method of claim 13, wherein the steps of informing
 2 comprise sending an e-mail notification to the consumer.

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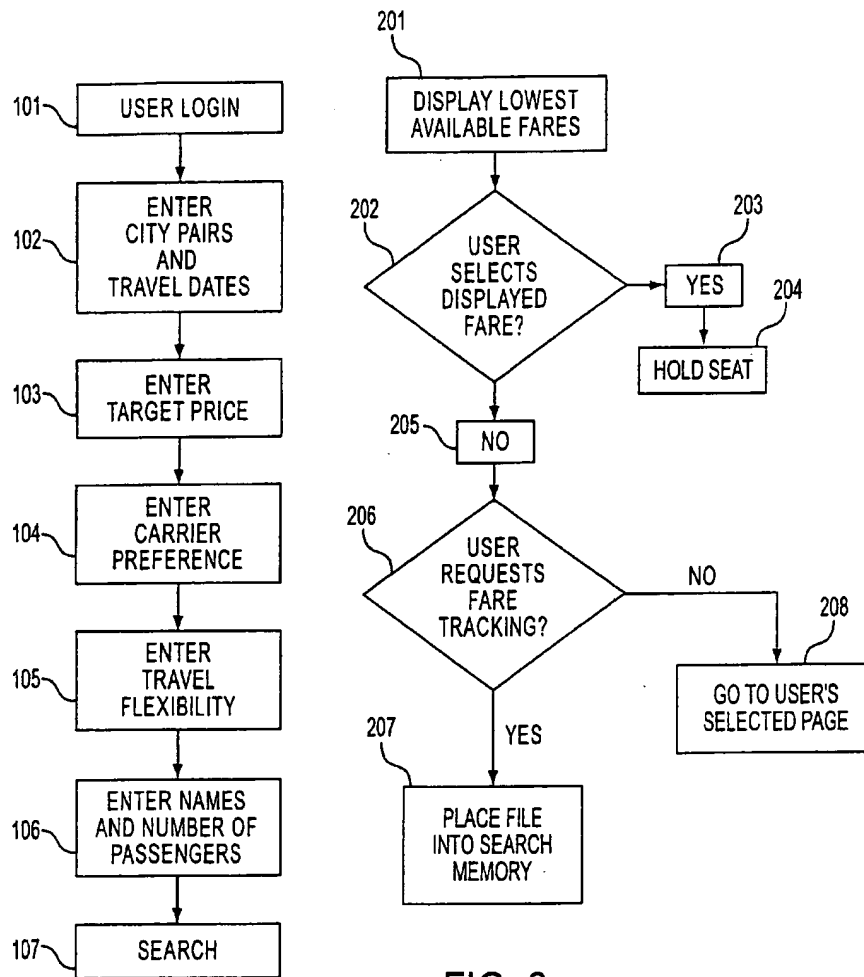


FIG. 2

FIG. 1

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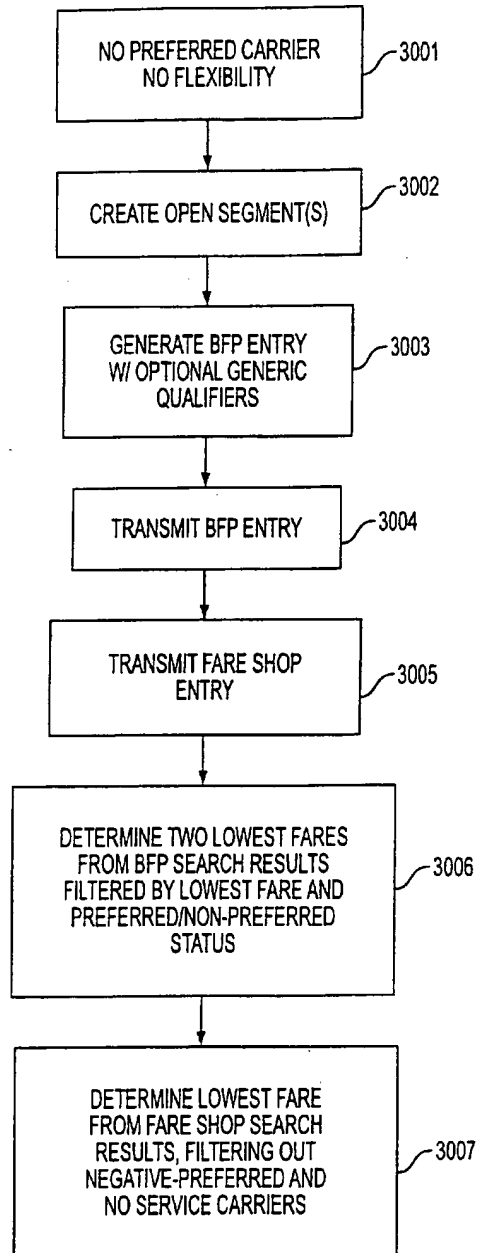


FIG. 3A

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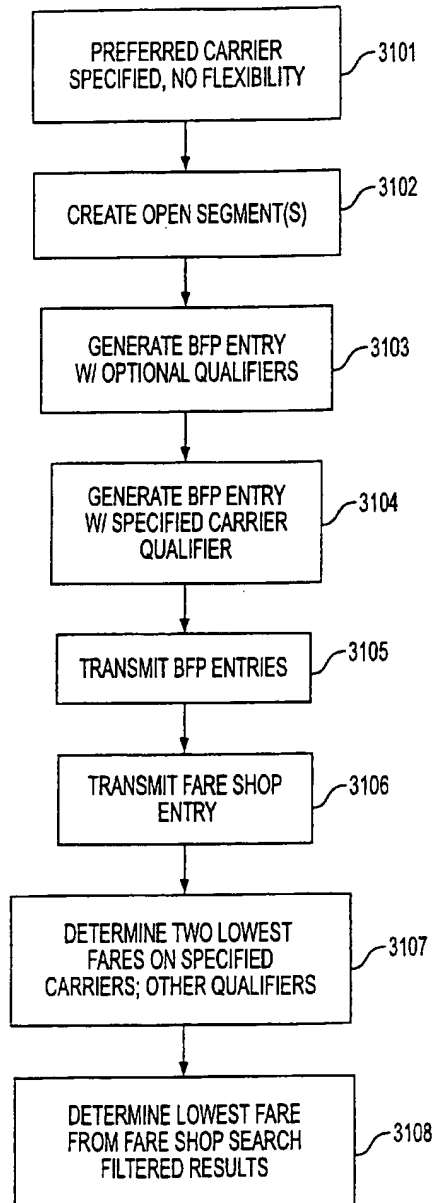


FIG. 3B

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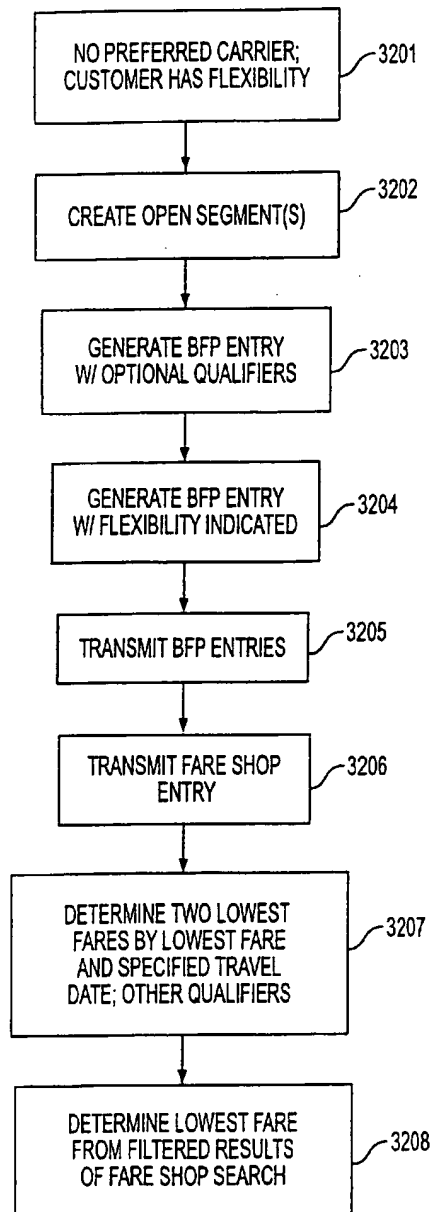


FIG. 3C

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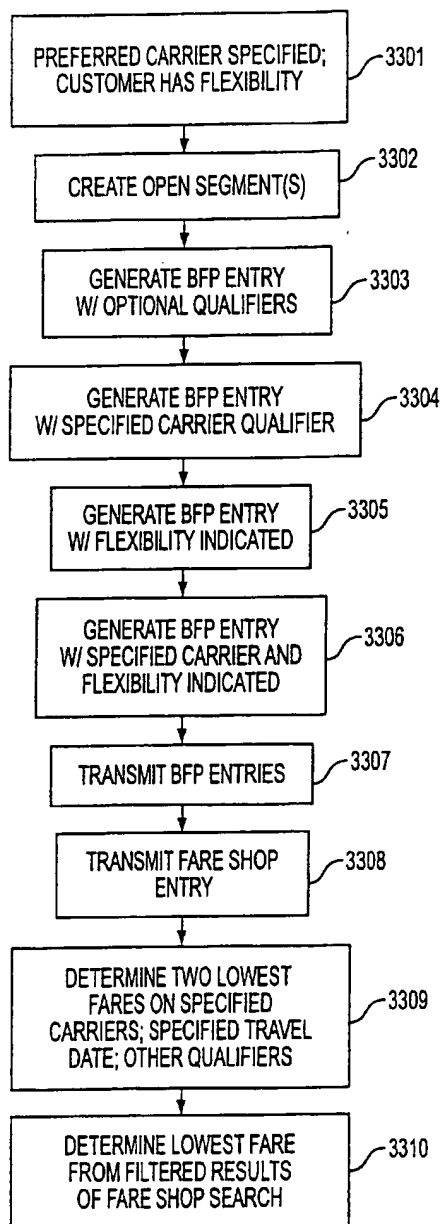


FIG. 3D

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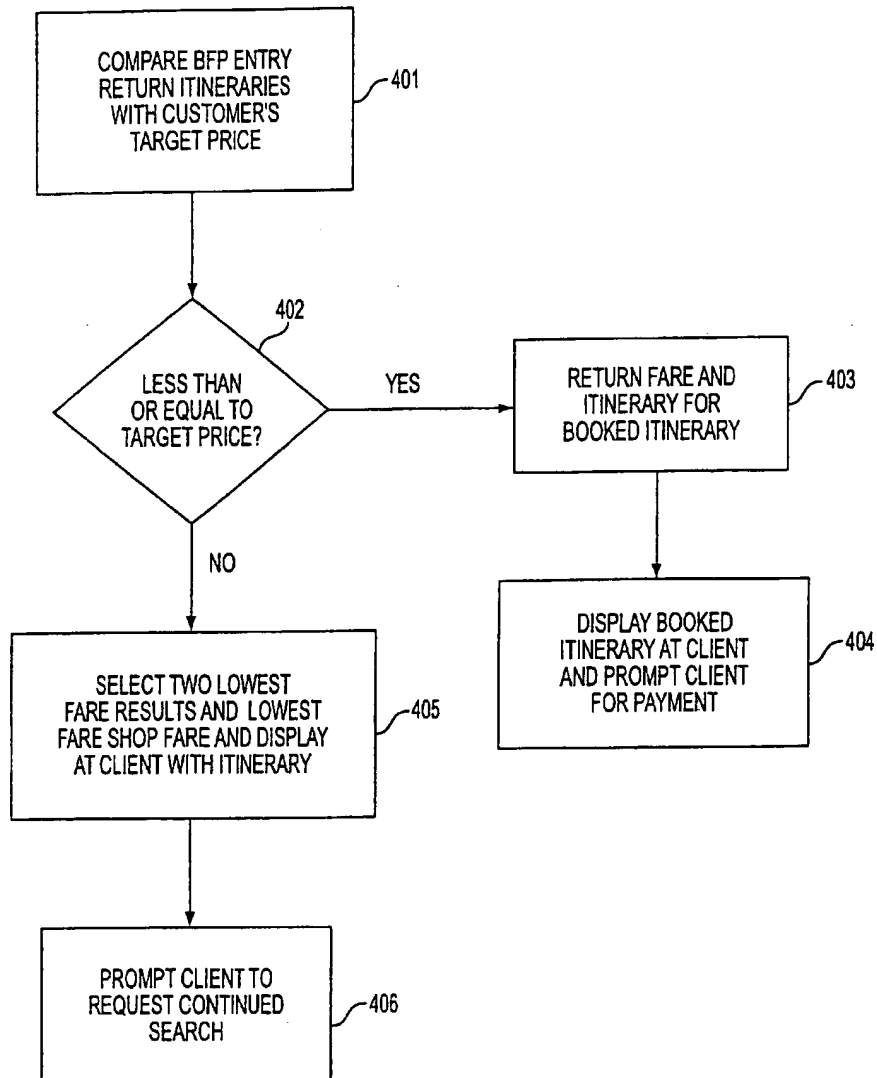


FIG. 4

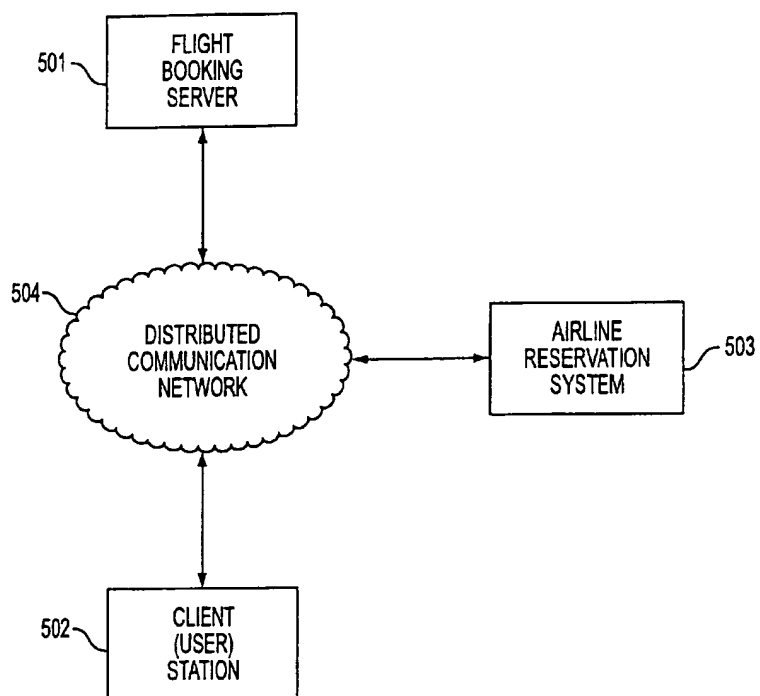


FIG. 5

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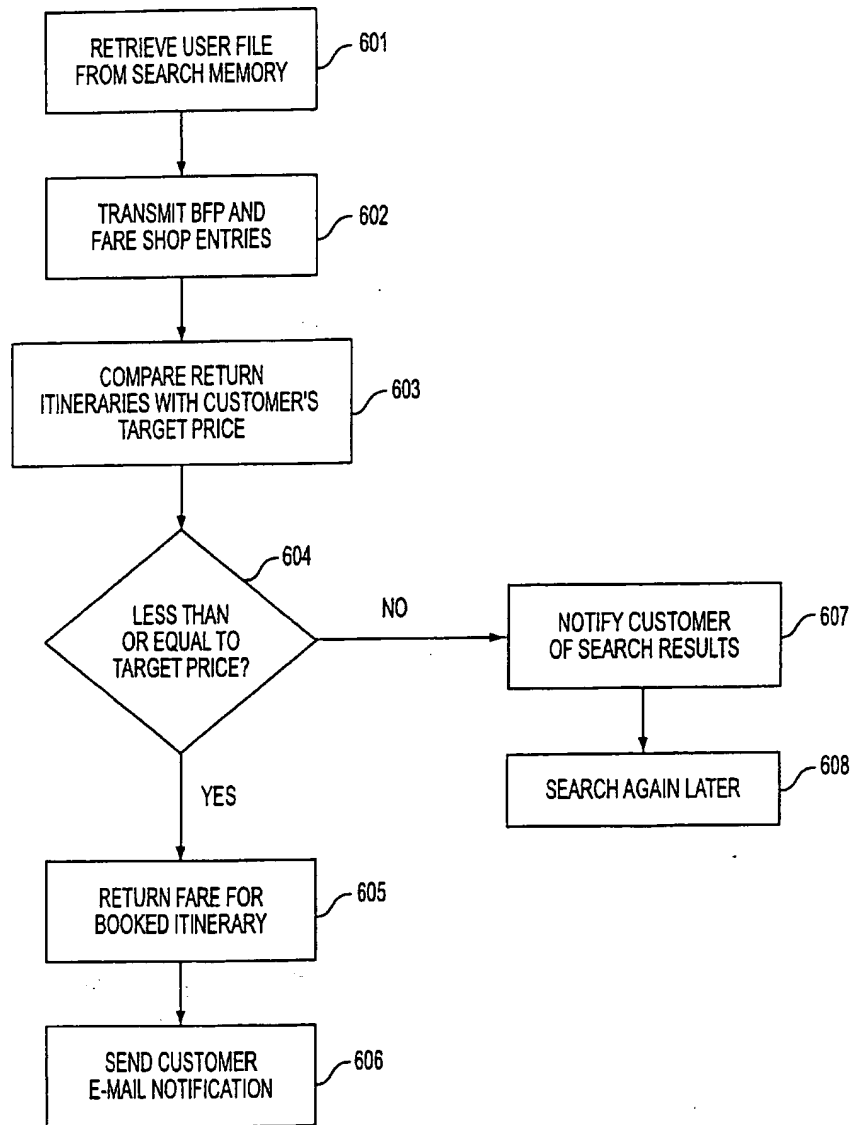


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/02326

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/60
US CL : 705/5, 26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/5, 26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONEElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST, DIALOG

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,732,398 A (TAGAWA) 24 March 1998, col.2, line 33 thru col. 6, line 64, and col. 15, line 50 thru col. 17, line 8.	1-14
A	US 4,449,186 A (KELLY et al.) 15 May 1984, entire document.	1-14
A	US 5,727,165 A (ORDISH et al.) 10 March 1998, entire document.	1-14



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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O document referring to an oral disclosure, use, exhibition or other means	
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Date of the actual completion of the international search

05 MAY 2000

Date of mailing of the international search report

13 JUN 2000

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